

## Other Developments

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### Mexican spotted owl survey at Grand Canyon

by R. V. Ward

The Mexican spotted owl (*Strix occidentalis lucida*, inset), federally listed as threatened in 1993, has long been considered by scientists to be a resident of old-growth coniferous forests in the Southwest. Owl surveys at Grand Canyon National Park in 2001 and 2002, however, uncovered 53 Mexican spotted owls in rugged, rocky canyon habitat. Finding this number of owls living in an unusual habitat type represents a significant increase in the known population of this species in Arizona.

Roosts and nests were generally located on rock shelves rather than in the few coniferous trees available. Field crews reached remote backcountry locations on extended backpacking trips and on seven raft trips through the Grand Canyon on the Colorado River. Owls responding to human imitations of their characteristic four-note hoots frequently came within 10 feet of the surveying crews. Surprisingly, several owls were also located below the

canyon rims immediately adjacent to the park's developed areas.

These findings resulted in the establishment of 39 Protected Activity Centers surrounding the owl locations, ranging from 700 to 1,000 acres and subject to the management recommendations contained in the Mexican Spotted Owl Recovery Plan. The data have also facilitated consultation with the U.S. Fish and Wildlife Service as required under the Endangered Species Act for the numerous development projects under way at Grand Canyon National Park, including a trail system expansion and improvements in the transportation system. This project, which was supported by a Natural Resource Preservation Program, exemplifies the important link between good science and sound resource management in the National Park System. ■

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### Hopes high for condor nesting success

by Elaine F. Leslie

Biologists' hopes ran high in 2002 for breeding California condors in Grand Canyon National Park, Arizona. In March, following months of observing condor courtship and attempts to locate appropriate caves and ledges for nesting, park biologists confirmed that two pairs of condors were nesting just off the South Rim in clear sight of biologists and the public.

Condors typically lay one egg and incubation lasts 60 days. The park organized a Nestwatch Program; more than 20 volunteers from across the state recorded incubation shifts and foraging behavior of the four adult birds from sunrise to sunset. For the first time park staff had an opportunity to collect behavioral data on condors nesting in the Arizona wilds.

The nests faced each other on opposing cliffs, and nest watching became an interpretive event. National Park Service biologists provided scopes and binoculars and helped park visitors view the nests. Just days before the hatching, biologists and the public watched as condor incubation shifts ceased abruptly for both pairs, indicating nest failures.

Biologists were not surprised by the failed nests because the parent condors were young and inexperienced. Other possible causes of the failed nests include attacks by predators such as ravens and the parents' possible exposure to lead in the environment, which can affect egg viability. Rangers rappelled to one of the failed nests and retrieved eggshell frag-

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## Small parks, big biodiversity

by Brent W. Steury

Inventory efforts under way throughout the National Park System highlight the biological importance of small parks. Piscataway and Fort Washington Parks in Maryland are no exception. From 1995 to 2002 the park biologist at National Capital Parks–East undertook an inventory of vascular plants for both national parks. Although the combined area of the two parks is just 4,800 acres, the inventory yielded a total of 988 vascular plant taxa, representing 973 species. A voucher specimen, a sample deposited in the park’s herbarium, or photographic documentation was obtained for each taxon. Additionally, historical occurrences of plants were determined through searches of other local herbaria.

Discovering such a rich diversity of plant life only 10 miles south of the nation’s capital was surprising. Less surprising was the discovery that nonnative plants comprised 25.3% of the parks’ vascular flora.

Seventeen species are known only from historical records and 31 plants are listed as endangered or threatened by the State of Maryland. An additional 49 species located during the survey are included in the state list of rare, threatened, or endangered plants of Maryland, with state rankings from uncommon to highly rare.

A paper containing the complete vascular plant species list for Piscataway and Fort Washington Parks and descriptions of the plant communities, historical land use, and physiography of the parks will be published in a 2003 edition of the journal *Castanea*. Park resource managers will use the inventory results in future vegetation mapping projects, exotic plant control efforts, and long-term monitoring of rare plant populations. ■

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Maroon Carolina milkvine (*Matelea carolinensis*) is one of 31 species documented in the inventory that has state endangered or threatened status.

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ments for laboratory analysis. They also recovered pieces of bone from the late Pleistocene and historical times, evidence that condors inhabited the same nest site 10,000–11,000 years ago and in the late 1800s.

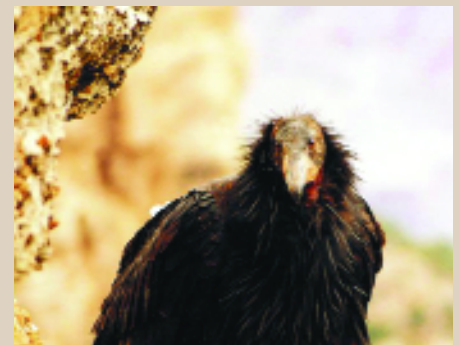
One of the most endangered birds in the world, the condor was reintroduced to northern Arizona in 1995 in an effort to restore this component of the ecosystem that had been absent for more than 100 years. Because of this endeavor there are now 33 wild condors in Arizona. Although challenges still face the program, biologists are eager for the 2003 breeding season, as four pairs of condors will be of breeding age. Two pairs have already returned to the 2002 nesting sites and

a third nest has been located on the North Rim. The fourth nest remains to be found. ■

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## Other Developments

### AWARD-WINNER PROFILE

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Wayne Brewster

### Brewster leads Yellowstone through precedent-setting issues

Wayne Brewster's leadership ability has allowed him to set precedents. This talent also brought him something else: this year's Director's Award for Natural Resource Management.

Wayne came to Yellowstone National Park in 1991 when the park faced some of the most contentious and complex issues in its history. Although some people would have shuddered at the challenges, Wayne considers himself lucky. "I've been fortunate to be in the right place at the right time. I've been a part of projects that will make a difference for a long time, and that's the rewarding part." Wayne had two particularly complex missions on his agenda and tackled them both with success.

First was the reintroduction of wolves into Yellowstone. The year 2002 marked the eighth year of the experiment and the third successive year in which more than 30 pairs have reproduced throughout the Rocky Mountain recovery area, thus preparing the animal for possible removal from the threatened species list. This project started when Wayne collaborated with the U.S. Fish and Wildlife Service to author the environmental impact statement, which drew the largest public response (280,000 comments) in the

Department of the Interior's history. Nearly all the predictions in the statement have been fulfilled except two: the anticipated time and cost were inaccurate. Wayne has overseen a program that is ahead of schedule and under budget.

The second mission was completion of an interagency bison management plan, which had begun a decade earlier. Bison carry brucellosis, a disease that can cause fetal abortions in cattle. Until 2000, when cold weather forced bison outside the park, the Montana Department of Livestock and Department of Wildlife and Parks, and NPS staff at Yellowstone summarily killed these animals. But in 2000, Wayne's efforts to change this system paid off when the plan was implemented. The plan balances the goals of reducing the risk of transmission of brucellosis to cattle with the preservation of 2,300–3,000 free-roaming bison. Although some bison that leave the park may continue to be killed, they are first tested for brucellosis. Those testing negative may be allowed to remain outside the park in limited numbers in special management zones.

Wayne has been described as the "field commander" for his involvement in both of these long-pressing issues. ■

### Discovering life in the national parks

by Ben Becker and Christie Denzel Anastasia

*"If we were to visit another planet the first thing we would do is conduct a systematic inventory of that planet's life. Oddly, enough, we have never done that for our own planet."*

—Edward O. Wilson

As the National Park System becomes an increasingly important repository for many of North America's disappearing species, the National Park Service has made inventorying biological diversity a priority. An

emerging model for inventorying life in national parks is the All Taxa Biodiversity Inventory (ATBI), an inventory system that documents *all* the organisms in a natural system. The information generated through the ATBI process is used to develop conservation and management strategies. The successful implementation of an All Taxa Biodiversity Inventory at Great Smoky Mountains National Park, Tennessee and North Carolina, has spurred Point Reyes National Seashore in California to do the

same. In 2002, Point Reyes began the National Park Service's first *marine* ATBI.

The Pacific Coast Learning Center at Point Reyes National Seashore organized more than a dozen community groups, scientists, and educators to initiate an ATBI process for Tomales Bay, California. Although threatened by pollution, sedimentation, and invasive species, Tomales Bay remains one of the most pristine bays on the West Coast of North America. The bay provides critical habitat for many





Dr. Jim Halfpenny, coauthor of the Lynx project study and animal track expert, examines possible lynx tracks found near Mud Volcano in Yellowstone National Park. Gait patterns, stride, and straddle measurements help wildlife researchers determine if the tracks belong to lynx.

## Found: The missing lynx!

by Kerry Murphy

Biologists continue to find positive evidence of Canada lynx (*Lynx canadensis*) presence in Yellowstone National Park (Wyoming, Montana, and Idaho). In February 2002 they found probable tracks of this federally listed threatened species during snow tracking surveys, and at the end of April, mitochondrial DNA samples from the previous summer's hair-snaring survey tested positive for Canada lynx. Further tests confirmed that the hair-snared lynx was female.

The biologists collected the hair sample using the National Lynx Detection Protocol developed by scientists at the Rocky Mountain Research Laboratory at the University of Montana. Under the protocol, each transect consists of five stations spaced at 100-meter intervals. In 2001, biologists deployed 32 hair-snare transects. Each station comprises a hair-snare, which is a 4x4-inch carpet square with small nails and ground catnip leaves, placed 18 inches above ground, and a scent pad consisting primarily of oil from beavers hung nearby. Attracted to the scent pad, lynx rub against the hair-snare. Samples are collected by biologists at two-week intervals, stored in vials with a drying agent, and then sent to the university's Carnivore Conservation

Genetics Laboratory for DNA analysis. There, DNA is chemically extracted and specific regions of the DNA molecule are replicated using a polymerase chain reaction. Restriction enzymes and a gel are used to identify DNA fragments that originate from lynx. If needed, additional tests can be used to estimate the cat's sex.

Yellowstone National Park managers hope for continued success in locating lynx as they enter the third year of a three-and-a-half-year survey. ■

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species and natural communities. The project has already secured more than \$85,000 in nongovernmental grants, established science and education teams, and begun collecting data on birds, mammals, algae, invertebrates, and fish. Plans are also under way for mudflat monitoring by high school students, and an invertebrate "bioblitz," an opportunity for taxonomic specialists to rapidly identify collected species. This systematic inventory will help preserve species and habitats, inspire stew-

ardship through participation in education initiatives, and create a model for marine biodiversity research. ■

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Pacific angel shark, Point Reyes National Seashore.